

Fleet Average Calculator User Guide, for Large Fleets

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Nearly all self-propelled off-road diesel vehicles over 25 horsepower (hp) used in California and most two-engine on-road vehicles (except on-road two-engine sweepers) are subject to the Regulation for In-Use Off-Road Diesel-Fueled Fleets (off-road regulation). Information about regulation requirements is available at <http://www.arb.ca.gov/ordiesel>

Important Notes

- The Fleet Average Calculator was created with **Microsoft Excel 2010**, and may not function properly in older versions of Excel.
- This calculator is for **large fleets** only (i.e., those with 5,000 or more total hp).
- The calculator only includes the first compliance date for large fleets, January 1, 2014.
- The calculator reflects the December 2010 revisions to the in-use off-road diesel vehicle regulation (i.e., those that become effective in December 2011).
- The calculator does **NOT** account for all provisions in the regulation. Provisions not reflected in the calculator include: Vehicles and Systems Used in Place of Diesel Vehicles (§2449(d)(1)), Exemptions from Best Available Control Technologies (BACT) (§2449.1(b)(2)), Order of BACT Requirements (§2449.1(b)(4)), and Delay Tier 2 Turnover (§2449.1(b)(6)).
- There are situations where a small or medium fleet (less than 2,500 hp's or between 2,500 and 5,000, respectively) must report as a large fleet; for example, all state and federal fleets automatically count as large fleets. A fleet in this situation may use this calculator even if it has 5,000 or less total horsepower.
- A fleet may want to test multiple compliance scenarios ("plans"), and save several large fleet average calculator results in order to compare a variety of plans.

Introduction

The large fleet average calculator is a spreadsheet that takes the vehicle hp's and engine model years and calculates a fleet's January 1, 2014 large fleet requirements for the off-road regulation. Large fleets can enter actions taken on vehicles such as retrofits, retirements, and engine repowers during the calendar year of 2013, and they will be able to see how these actions will affect their compliance – in this way, a fleet can experiment with a variety of different actions to find the best way to comply with the off-road diesel vehicle regulation. For general information about the regulation, please visit our Knowledge Center: <http://www.arb.ca.gov/msprog/ordiesel/knowcenter.htm>. For information about meeting emissions performance requirements, please read the compliance overview FAQ at <http://www.arb.ca.gov/msprog/ordiesel/faq/off-road-requirements.pdf>.

Calculator Overview

User Input
Requirement Met
Requirement not Met
Locked cell

User input: white cells are where users can enter their vehicles' information.

Requirement met: green cells indicate that a fleet is compliant by either meeting the Fleet Average Target or the BACT Requirements.

Requirement not met: red cells indicate that a fleet has not met one of the methods of compliance. (Note that as long as it meets either the fleet average or BACT requirements, i.e., at least one is green, the fleet is in compliance with the off-road regulation.).

Locked cell: grey cells have values that the fleet average calculator automatically calculates. Users cannot select these cells, nor can they enter information into them.

Using the Calculator

Step 1: Entering Baseline Fleet Information

Early Credits:	400	Early Compliance Met? (Y/N)									
Baseline fleet information prior to January 1, 2013											
Total Fleet Horsepower	Fleet Size	Fleet Average Index									
7945	LARGE	11.2									
Vehicle EIN (Optional)	Vehicle Serial # (Optional)	Your Vehicle # (Optional)	Engine Model Year	Horsepower	Is this an On-Road Engine? (Y/N)	PM VDECS Level (1, 2, or 3)	NOx VDECS Level (% reduction)	Emission Factor if Non-standard	Engine Tier	Emission Factor	Target Factor
Test EIN	Test Serial	Test vehicle #	2011	61					T4I	3.0	6.5
Test EIN	Test Serial	Test vehicle #	1997	160					T1	6.9	6.4
Test EIN	Test Serial	Test vehicle #	1994	31					T0	7.1	5.8

Figure 1: a fleet's baseline fleet information has been entered into the calculator.

You will begin by entering vehicle information in to the table on the left side of the Excel worksheet (titled "baseline fleet information prior to January 1, 2013"), as shown in Figure 1 above. For the calculator to operate, engine model year and hp are required. Your fleet data may be copied from the Diesel Off-road On-line Reporting System (DOORS) and pasted into the calculator; see Appendix A for instructions. If you are not pasting data from DOORS, enter in the engine model year and hp in the appropriate cells for each of your vehicles. You may enter either the EIN, serial number, or your own vehicle number for each vehicle into the first column to help you keep track of your vehicles. If your vehicle has an on-road engine (on-road engines are certified to on-road emissions standards), Particulate Matter (PM) or Oxides of Nitrogen (NOx) verified diesel emission control strategy (VDECS), or has an engine that has been certified to a different emissions standard (besides on-road emissions standards), indicate so in the correct vehicle column. The calculator will automatically pull in the on-road emission standard if you mark "Y" in the "Is this an on-road engine" column. Keep in mind that not all provisions of the off-road regulation are accounted for in this calculator; please see the "Important Notes" section above for more information.

Please see the Knowledge Center (link above) for more information on how these vehicles are affected by the in-use off-road diesel vehicle regulation. As you enter vehicle information for your fleet, the calculator automatically updates its calculated values such as engine tier and emission factor.

Once all the vehicles in your fleet have been entered you must manually enter any early credits you have accrued prior to using this calculator, and you must also determine if your fleet is eligible for the Delayed Requirements for Early Compliance (§2449.1(b)(7)). You will find your early credits and your Early Compliance eligibility within the Compliance Snapshot page in DOORS. Log on to your fleet in DOORS, and click on your fleet in the left-hand window. Once you've selected your fleet, a series of options will appear in the middle window. Scroll down to the bottom of these options (using the middle window's scroll bar), click on the Compliance Snapshot button as shown in Figure 2a, and you will be taken to your fleet's Compliance Snapshot page.

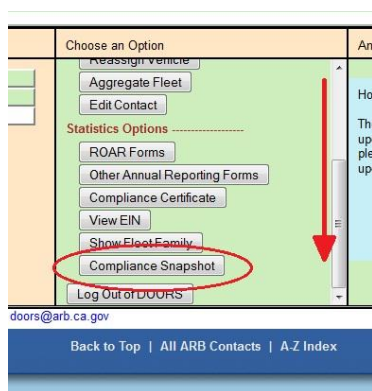


Figure 2a: finding the compliance snapshot page in DOORS.

Calendar Year	BACT HP	Begin Credit	End Credit	Compliance Method
2014	na	4,838	4,838	credit early compliance
2015	2970.248	4,838	1,868	credit used

Credit Summary

Figure 2b: determining eligibility for the Delayed Requirements for Early Compliance.

On the Compliance Snapshot page scroll down to just above the "Credits Summary" section and you will see a table summarizing the years through which your fleet is compliant. If the "Compliance Method" for the 2014 calendar year is listed as "credit early compliance" then you have met the Early Compliance requirements for 2014, as shown in Figure 2b above. If you have met the Early Compliance requirements, indicate as such in the top-left corner of the Baseline Fleet Information table, as shown in Figure 4a on the next page. Next, scroll all the way to the bottom of the Compliance Snapshot, where you will see the Credit Summary table. Take the Credit Total at the bottom of the Credit Summary table and enter it into the Early Credits cell at the top-left corner of the Baseline Fleet Information table in the calculator, as shown in Figures 3 and 4a. However, be sure not to use the Early Reduced Fleet HP credit, which may only be used for 2015 and beyond (i.e. cannot be applied for the January 1, 2014, compliance date), as shown in Figure 4b on the next page.

(18)	Interim Replacement/Retirement	0
(10)(A)	Turnover	
	- Retirement	0
	- Repower / Rebuild (higher tier)	0
	- Permanent Low-Use	0
(10)(B)-(D)	VDECS	
	- Highest level PM VDECS credit	0
	- NOx VDECS credit	0
	- NOx + Highest level PM VDECS credit	0
(11)	Excess PM VDECS credit used for compliance with the off-road and truck and bus regulations	
	- From Truck and Bus	
	- Given to Truck and Bus	
	Credit Total	526 Hp prior years: 526 current year: 0

Figure 3: scrolling down to find the Credit Total.

Early Credits:	526	Early Compliance Met? (Y/N)	Y
Baseline fleet information			
Total Fleet Horsepower	Fleet Size	Fleet Average Index	

Figure 4a: entering the Credit Total into the Early Credits cell, and noting eligibility for the Delayed Requirements for Early Compliance.

0 Hp + 900 Hp after 2014

Figure 4b: do not enter in credits that are only available after 2014.

Step 2: Entering in Actions Taken on the Fleet

The table on the right side of the fleet average calculator (titled “actions taken on fleet between January 1, 2013 and December 31, 2013”) is where you enter in actions taken on your fleet, as shown in Figure 5.

Actions taken on fleet between January 1, 2013 and December 31, 2013											
Total Fleet Horsepower	Fleet Size	Fleet Average Index	Fleet Average Target Rate	1/1/2014 Target Met?	BACT Requirement	Credits Earned	1/1/2014 BACT Met?	Carryover BACT Req. for 1/1/2015	Excess BACT Credit for 1/1/2015		
7945	LARGE	11.2	6.2	NO	381	400	YES	0	19		
Vehicle EIN (Optional)	Vehicle Serial # (Optional)	Your Vehicle # (Optional)	Engine Model Year	Horsepower	Is this an On-Road Engine? (Y/N)	PM VDECS Level (1, 2, or 3)	NOx VDECS Level (% reduction)	Emission Factor if Non-standard	Engine Tier	Emission Factor	Target Factor
Test EIN	Test Serial	Test vehicle #	2011	61					T4I	3	6.5
Test EIN	Test Serial	Test vehicle #	1997	160					T1	6.9	6.4
Test EIN	Test Serial	Test vehicle #	1994	31					T0	7.1	5.8

Figure 5: a fleet's baseline information is copied into the table on the right side of the fleet average calculator, pictured above.

All of the information you entered into the baseline fleet table is copied over to this table. You can mark vehicles as retired, you can replace an older engine with a newer engine (called a repower), you can put in new PM or NOx VDECS, or you can enter in newly-purchased vehicles. Each of the above actions may have an impact on your fleet average index, and can also generate BACT credit in order to be in compliance. Below are the steps to represent these actions in the fleet average calculator:

- Retiring a vehicle: to retire a vehicle from your fleet or designate a vehicle as permanent low-use, replace its hp with an “R”, as demonstrated in Figure 6. You must leave the engine model year unchanged.

Figure 6: marking vehicles as retired or permanent low-use.

2012	57
2012	450
1988	R
1987	R
1999	100
2001	87

- **Repowering:** To repower a vehicle, replace its engine model year and hp with the new engine's model year and hp, as shown in Figure 7.
- **Entering a new vehicle:** To enter in a new vehicle, enter in its engine model

2000	27					T1	6.2	5.8		2000	27
1956	250					T1	6.2	5.8		2010	280
1987	300					T0	15.9	6.2		2010	302
1988	155					T0	11.9	5.9		2010	150
2011	201					T0	9.3	6.4		2011	200
2012	57					T4i	1.5	6.2		2011	201
						T4i	1.5	6.2		2012	57
						T4i	3.0	6.5			

Figure 7: repowering vehicles.

year and hp (and other information if you so choose) just like you did with the rest of your vehicles, except this time in the right-hand table, as per Figure 8.

1999	300					T1	6.9	5.9		1999	300
2001	250					T1	6.9	6.2		2001	250
2000	300					T1	6.9	5.9		2000	300
										2013	100

Figure 8: entering a new vehicle.

- **Entering a VDECS:** To enter in new VDECS, enter in its level (level 1, 2, or 3) if it is a PM filter; note that a Level 1 VDECS is not eligible for credit in the off-road regulation. If the VDECS is a NOx filter, enter in its percent reduction value. When entering in the percent reduction for NOx VDECS, type the percent as a number; for example, for 40 percent reduction, type in 40, not 0.40 or 40%. A single VDECS system may potentially be both a PM and a NOx filter. To see if there is a verified exhaust retrofit available for a given vehicle, see our VDECS webpage here: <http://www.arb.ca.gov/msprog/ordiesel/vdecs.htm>. Examples of VDECS entered into the calculator are shown in Figure 9.

2005	300					3	20%
2000	112						
1972	450					2	
1988	250						40%
1999	300						
2001	250						
2000	300						

Figure 9: entering in new VDECS.

- **Designating a vehicle as part-time agricultural, emergency, or dedicated snow removal:** If you are designating a vehicle as part-time agricultural use (over half time but not exclusive to agricultural operations), emergency use, or as a dedicated snow-removal vehicle, these actions will remove such vehicles from the Fleet Size and/or Fleet Average Index, but will NOT generate BACT credits. To represent such actions in the calculator, delete the engine model year and hp and leave the space blank, as demonstrated in Figure 10.
- **Designating a vehicle as year-by-year low-use:** designating a vehicle as year-

Figure 10: removing vehicles without generating BACT Credits; this applies to part-time agricultural use, emergency use, and dedicated snow removal vehicles.

2008	200					T3	2.6	6.2		2008	200
2000	27					T1	6.2	5.8		2010	280
2000	27					T1	6.2	5.8		2010	302
2000	27					T1	6.2	5.8			
1956	250					T0	15.9	6.2			
1987	300					T0	11.9	5.9			

by-year low use at any point in 2013 should be represented by completely removing the vehicle from the Baseline Fleet Information table. As with

designating part-time agricultural vehicles above, designating a vehicle as year-by-year low-use will not generate BACT Credits, but it will also not be counted against your total Fleet Size or Fleet Average Index. The difference is that designating a vehicle as year-by-year low-use will lower your BACT Requirements for that year in addition to the above.

Step 3: Bringing a Fleet into Compliance for 2014

In order for a fleet to be in compliance for the January 1, 2014 compliance date, its fleet average index must be equal to or less than its fleet average target, OR the fleet must take actions on enough vehicles to meet the fleet's BACT Requirements. The BACT Requirement is the BACT Rate (a percent) multiplied by the total fleet size hp. For 2014, the BACT rate is 4.8 percent. For example, a fleet with 10,000 hp would have a BACT Requirement of 480. An example of a fleet not meeting the January 1, 2014 requirements is displayed in Figure 11.

Actions taken on fleet between January 1, 2013 and December 31, 2013											
Total Fleet Horsepower	Fleet Average Index	Fleet Average Target Rate	1/1/2014 Target Met?	BACT Requirement	Credits Earned	1/1/2014 BACT Met?	Carryover BACT Req. for 1/1/2015	Excess BACT Credit for 1/1/2015			
5152	6.4	6.1	NO	247	150	NO	0	0			
Vehicle EIN (Optional)	Vehicle Serial # (Optional)	Your Vehicle # (Optional)	Engine Model Year	Horsepower	Is this an On-Road Engine? (Y/N)	PM VDECS Level (1, 2, or 3)	NOx VDECS Level (%) reduction	Emission Factor if Non-standard	Engine Tier	Emission Factor	Target Factor
Test EIN	Test Serial	Test Vehicle #	2011	61					T4I	3	6.5
Test EIN	Test Serial	Test Vehicle #	1997	160					T1	6.9	6.4
Test EIN	Test Serial	Test Vehicle #	1994	31					T0	7.1	5.8

Figure 11: the Fleet Average Index must be less than or equal to the Fleet Average Target Rate; alternatively, the fleet can generate enough BACT Credits to meet it's BACT Requirements.

If a fleet turns over eligible vehicles, BACT Credit will be generated and the Fleet Average Index will simultaneously decrease, possibly allowing the fleet to meet the Fleet Average Target Rate. In this case, the fleet will still accumulate BACT credit which may be used to comply with future compliance dates. Once a fleet has met either the Fleet Average Target or the BACT Requirements, the appropriate cells will show as green instead of red, as shown in Figure 12, along with any excess BACT Credit for future compliance dates.

Actions taken on fleet between January 1, 2013 and December 31, 2013											
Total Fleet Horsepower	Fleet Size	Fleet Average Index	Fleet Average Target Rate	1/1/2014 Target Met?	BACT Requirement	Credits Earned	1/1/2014 BACT Met?	Carryover BACT Req. for 1/1/2015	Excess BACT Credit for 1/1/2015		
7945	LARGE	11.2	6.2	NO	381	400	YES	0	19		
Vehicle EIN (Optional)	Vehicle Serial # (Optional)	Your Vehicle # (Optional)	Engine Model Year	Horsepower	Is this an On-Road Engine? (Y/N)	PM VDECS Level (1, 2, or 3)	NOx VDECS Level (%) reduction	Emission Factor if Non-standard	Engine Tier	Emission Factor	Target Factor
Test EIN	Test Serial	Test vehicle #	2011	61					T4I	3	6.5
Test EIN	Test Serial	Test vehicle #	1997	160					T1	6.9	6.4
Test EIN	Test Serial	Test vehicle #	1994	31					T0	7.1	5.8

Figure 12: even though this fleet has not met its Fleet Average Target Rate, it is able to stay in compliance by generating enough BACT Credits to meet the fleet's BACT Requirement. Additionally, the left-over BACT Credit is carried over into 2015.

A requirement of the off-road regulation is that vehicles with Tier 0 and Tier 1 engines must be turned over first before credit is given for turning over vehicles with higher tier engines (§2449.1(b)(4)). Note that the calculator does not account for incorrect turnover of newer vehicles; for example, the calculator will allow a fleet to generate credit for

turning over a Tier 2 vehicle before a Tier 0 vehicle, but in reality no credit will be generated for the fleet.

Some vehicles are exempt from the BACT Requirements, meaning they do not need to be turned over in order to comply with the BACT Requirements. The exemptions are as follows:

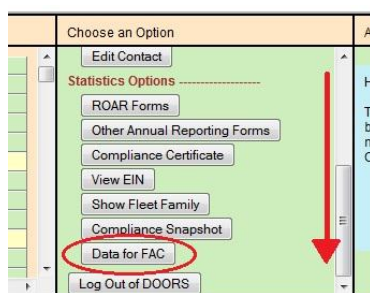
- A vehicle that is less than 10 years old from its date of manufacture on the compliance date (January 1, 2014) is exempt.
- If a vehicle had level 2 or level 3 PM VDECS installed within the last 6 years, and that was the highest-level VDECS available at the time, it is exempt.
- If the vehicle came with an original verified exhaust filter, or if the vehicle has a Tier 4 Interim or Tier 4 Final engine, then it is exempt.

The calculator does not take these exemptions into account, so the calculator will show credits for actions taken on any vehicle, even if it is exempt. If your fleet contains such exempt vehicles and you have turned them over, remove them from your fleet by deleting their engine model year and hp (refer to figure 10 on page 5). A fleet that does not meet the Fleet Average Target must meet the BACT Requirements with the vehicles that do not qualify for an exemption. Where all of the vehicles in a fleet qualify for an exemption, the fleet is exempt from the BACT and Fleet Average Requirements for that year. Note that the three exemptions listed above do not lower the hp on which the BACT Requirements are calculated. For more information, see section 2449.1(b)(2) of the off-road regulation.

Appendix A: Guide to Pasting Fleet Data from DOORS into the Fleet Average Calculator

If you do not already have your fleet data in a format, such as a spreadsheet, which it can easily be pasted into the Fleet Average Calculator, your fleet data may be copied from your DOORS account.

The Air Resources Board (ARB) recommends you first copy all of your data from DOORS into a **blank** Excel workbook, then paste the appropriate portion into the Fleet Average Calculator. If you have a different version of Excel than shown in these instructions, your menu selections may be different; see Excel help for information.

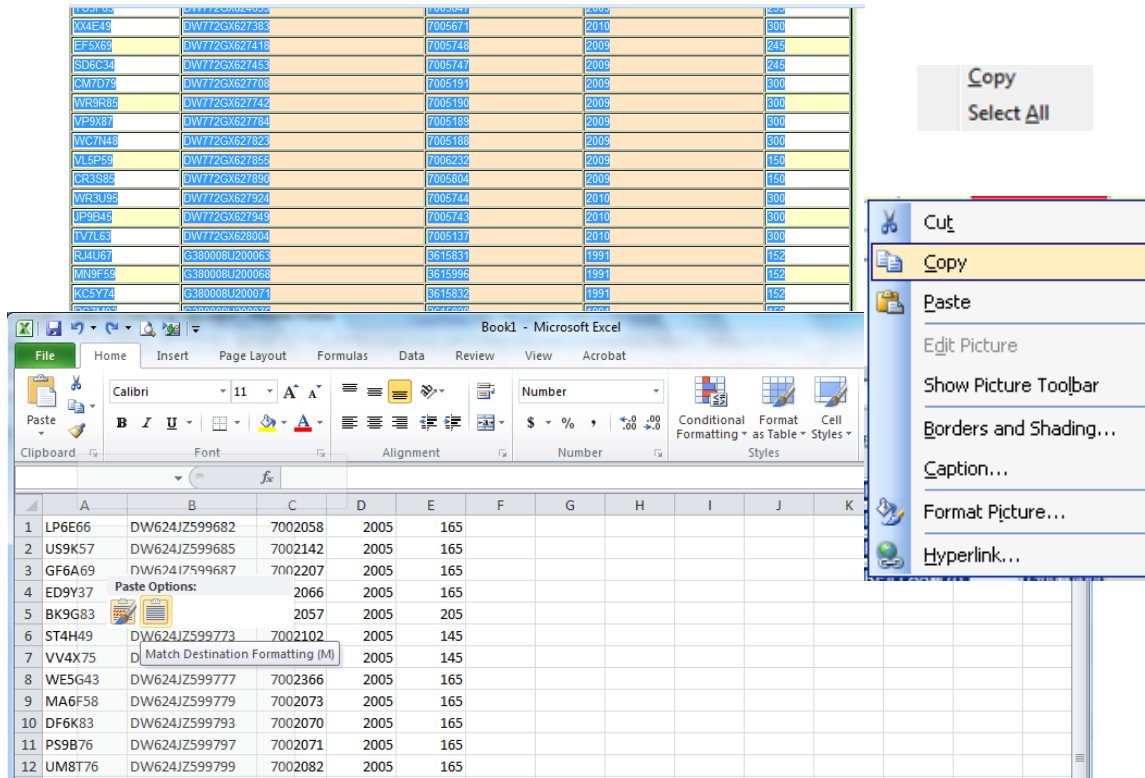


To copy your fleet data from your DOORS account, log into DOORS, choose “Data for FAC” button at the bottom of the main menu below Compliance Snapshot.

The Fleet Average Calculator data page in DOORS looks like the figure below. There are five fields. The calculator needs engine model year and hp. You can copy and paste all five columns directly into the Fleet Average Calculator. Notice that clicking on a column heading will sort all the data. For example, clicking on the Eng hp column heading will sort all data by lowest to highest hp, or click again and all data will sort by highest to lowest hp.

Excel Fleet Average Calculator Data				
Copy the vehicle information below and paste into the Excel Fleet Average Calculator .				
EIN	Veh serial num	Your veh num	Eng model year	Eng hp

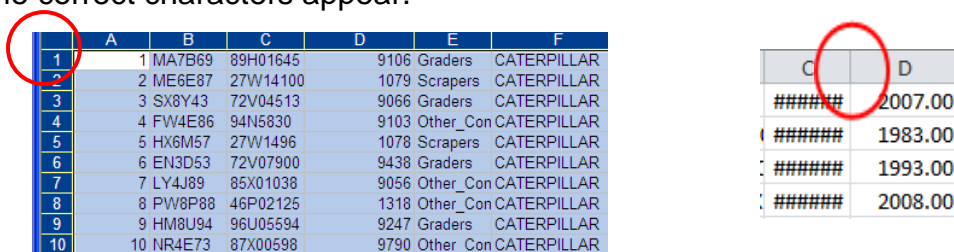
Select your data by holding down the left mouse button and moving the mouse, then right-click and choose Copy (or select from the top menu in Excel).



You can copy all the data at one time using Select All. However not all of the data needs to be copied at one time; portions may be done at a time, which may be easier if you have many vehicles in your fleet. Be sure to avoid copying the same data twice. To paste the data into the calculator, right-click and choose “Values” under “paste options”. After the data is in the calculator, check all the columns to ensure each field is correct. For example, larger numbers such as serial numbers may appear in engineering format, as shown in the second column below.

	A	B	C	D	E
1	GX4D89	1.14E+14	2767018	1994	42
2	AT6R74	1.14E+14	2767017	1994	42
3	XC9Y66	1.14E+14	2767020	1994	42
4	CL9D84	1.14E+13	2767019	1994	42

You can click on the top left cell (see circled cell below), and the entire workbook will be highlighted. Right-click, choose Format Cells, the Number under the Number tab. Also, some columns may then appear as all pound signs (#) – this simply means the column width is too narrow. To see the data in that column, at the top of the worksheet put your mouse cursor between that column and the column to the right of it, until the cursor displays as a double arrow, the hold left mouse button down and drag to the right until all the correct characters appear.



	A	B	C	D	E	F
1	1	MA7B69	89H01645	9106	Graders	CATERPILLAR
2	2	ME6E87	27W14100	1079	Scrapers	CATERPILLAR
3	3	SX8Y43	72V04513	9066	Graders	CATERPILLAR
4	4	FW4E86	94N5830	9103	Other_Con	CATERPILLAR
5	5	HX6M57	27W1496	1078	Scrapers	CATERPILLAR
6	6	EN3D53	72V07900	9438	Graders	CATERPILLAR
7	7	LY4J89	85X01038	9056	Other_Con	CATERPILLAR
8	8	PW8P88	46P02125	1318	Other_Con	CATERPILLAR
9	9	HM8U94	96U05594	9247	Graders	CATERPILLAR
10	10	NR4E73	87X00598	9790	Other_Con	CATERPILLAR

C	D
#####	2007.00
#####	1983.00
#####	1993.00
#####	2008.00

ARB recommends comparing the Fleet Average Index in the Fleet Average Calculator against the Average in the “Fleet Target and Average Emission Rates” table in the Compliance Snapshot in DOORS. They should match, and if not, perhaps some exempt vehicles are still in the Fleet Average Calculator.

If you have any questions regarding the Fleet Average Calculator, please contact Kyle Goff at (916) 323-1414 or via email at kgoff@arb.ca.gov.